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SCIENCE

FRIDAY, SEPTEMBER 9, 1887.

IN A COMMUNICATION made last year to the French Academy of Medicine (*Science*, viii. p. 29), Dr. Worms gave the results of his investigations concerning color-blindness among the *personnel* of the Northern Railway. The figures which he gave showed so small a percentage of color-blind employees as to warrant the conclusion that there is not much danger to be feared for railroad travellers from these defects. More recently Dr. Worms has informed Dr. Jeffries of Boston that this percentage was found among those employed after all had been examined on entering the service previously, — an explanation which gives an entirely different phase to the matter. The statistics given by Dr. Worms, and to which we have already referred, have been repeatedly quoted as an argument by those who do not admit the prevalence of color-blindness among railroad employees, and who therefore deem color-testing unnecessary. This use of the figures of Dr. Worms, which was justifiable in view of the form in which they were originally given, should now be abandoned in view of the later information received from him. This subject of color-blindness among railroad employees is attracting the attention of thoughtful men in all parts of the world. In our own country, Massachusetts has a statute in relation to the matter. This directs that no person shall be employed upon a railroad in any capacity which requires him to distinguish form or color signals unless he has been examined as to his sight by some competent person employed and paid by the railroad company, and has received a certificate. The phrase 'competent person' is a very elastic one, and it is feared that the examiner is not in all cases competent to make the tests. The Alabama legislature has enacted a law which is pronounced to be the best yet devised to overcome this evil. It provides for examinations conducted by experts, not according to rules of their own, but guided by standards both of visual power and of color-sense which are fixed by law. The railroad employees, under this law, are divided into two groups, — one containing engineers, firemen, and brakemen, in whom a high visual power and color-sense are demanded, and the other containing gatemen, conductors, and others, to whom an inferior standard is applied. Connecticut at one time had a law upon this subject, but, after one year's trial, so many employees were found deficient that in obedience to the demand of politicians it was repealed. In one instance a board of experts found twenty-four railroad employees to be color-blind. Their report of these facts created such an outcry among their friends that another test was demanded, with flags and lanterns and not with colored worsted as in the former test. This resulted in proving that of the twenty-four, twenty-one were wholly color-blind, and three color-blind in part. Dr. Worms has recommended that exercises on the colors should be carried out in the schools to reduce the percentage of the color-blind. In commenting on this recommendation, Dr. Jeffries says that no exercise with colors can change the congenital color-blind, who are four per cent of males everywhere. We hope to see this subject agitated until the provisions which are now in force in Alabama shall apply throughout the United States. It matters little to a traveller that his life is secure in one State by reason of stringent laws against color-blindness in railroad employees, if as soon as he crosses the boundary line and passes into another State, in which no such law exists, his life may be sacrificed by a color-blind engineer who, mistaking the red light of danger for the white light of safety, runs his train through an open drawbridge into the river below.

CO-OPERATION ON THE CONTINENT OF EUROPE.

II. GERMANY.

THE reply from Germany to Lord Rosebery's circular letter (see *Science*, No. 220, p. 395) is more systematic than that from France. At the very outset the writer says that among the working-classes of Germany co-operation has met with little favor: the well-to-do classes, on the other hand, have applied its principles with considerable success in many directions. This reluctance on the part of the working-people to co-operate is ascribed in a large measure to the fact that as a class they are incapable of appreciating the value of making provision for the future. They are not yet educated up to the point of making industrial co-operation a real factor in the improvement of their condition. The tendency toward State socialism in Germany is also an obstacle to co-operative development. Statistics as to co-operation are not easily obtained in Germany. Both the government and private societies are very reticent when asked for information on commercial or industrial questions. The most observant notice of co-operative movements, so far as they concern the artisan and laboring-classes, is probably taken by the Central Association for the Welfare of the Laboring-Classes, and its organ, the *Arbeiterfreund*; while very valuable statistics are to be found in the yearly report of the Central Union of German Co-operative Societies, on all which the report from Germany is based.

Associations belonging to this Central Union of German Co-operative Societies are entitled 'Registered Associations,' and are established under the Prussian law of March 27, 1867, and the German law of July 9, 1868. These laws grant special privileges to co-operative societies; that is to say, associations not restricting themselves to any fixed number of the members composing them, and got up with a view of facilitating the obtaining of credit, the earning of a livelihood, or prosecution of husbandry by their members by means of joint management of their business. A great number of associations have united themselves under the leadership of a counsellor in the Central Union.

Such enterprises are in Germany indissolubly connected with the name of their great founder, Schulze-Delitzsch. The movement, which he started and organized with extraordinary genius, is entirely based on the principle of 'self-help.' "If a man cannot save a few pence by denying himself a couple of glasses of beer a week," said Schulze, "I can do nothing for him." The history of Schulze's attempts are briefly as follows: In 1849 he founded at Delitzsch, in Saxony, a 'sickness and death' fund, which, for a small monthly subscription, afforded help and medicine to the poorer artisans and laborers in case of illness, continuous pecuniary support in cases of incapacitation for work, and contribution towards funeral expenses in cases of death. In 1850 Schulze started a loan society, and, in re-organizing the same in 1851, he introduced the principle of unlimited liability, and completed his system, as far as essentials were concerned, by forming capital for individual members by the introduction of inalienable shares. The example thus set was quickly followed, and many mutual help societies sprang up in various parts of Germany.

The principle of unlimited liability, on which Schulze most strongly insisted as the keystone of his system, was also adopted by Raiffeisen, who founded similar societies, chiefly in agricultural districts. The double effect seems to have been to raise the credit of co-operative societies, and to confine them to persons of small means, persons of larger fortune being shy of risking their whole property.

As mentioned above, the societies on the Schulze-Delitzsch plan have been regularly organized into an association, the principal objects of which were briefly described by him in the report of 1874 as being the following: "The General Union of the German Industrial and Economical Co-operative Societies, founded on the principle of self-help, the affairs of which are at present managed